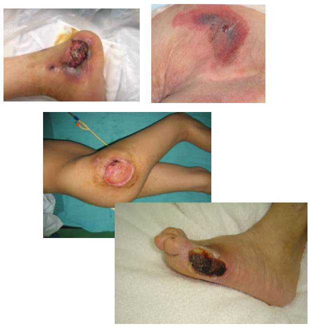
Pressure injury staging and prevention

Pressure injury Prevention

Etiology of a Pressure Injury

- Pressure
- Shear
- Friction
- Moisture

Etiology of a Pressure Injury

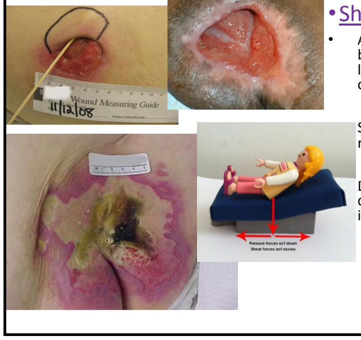


- **Pressure**
  - Localized injury from ischemia that caused tissue death
  - Pressure ulcers can develop when a large amount of pressure is applied to an area of skin over a short period of time.
  - They can also occur when less pressure is applied over a longer period of time.
  - The extra pressure disrupts the flow of blood through the skin.

Pressure

Pressure is the force that is applied vertically or perpendicular to the surface of the skin. Pressure compresses underlying tissue and small blood vessels hindering blood flow and nutrient supply. Tissues become ischemic and are damaged or die.

Etiology of a Pressure Injury



- **Shear**
  - A strain in the structure produced by pressure, when its layers are laterally shifted in relation to each other.

Skeleton moves but the skin remains fixed to the surface.

Diminishes circulation to tissue and damages tissue and blood vessel integrity

Shear - Shear occurs when one layer of tissue slides horizontally over another, deforming adipose and muscle tissue, and disrupting blood flow (e.g. when the head of the bed is raised > 30 degrees).

When the head of the bed is elevated, the effect of gravity on the body pulls it down toward the foot of the bed.

However, the body resists sliding and may stick to the sheet so the skin is held in place and the weight of the skeleton continues to pull the body downward.

Shear causes much of the damage seen with pressure ulcers.

Typically found over bony prominences or around/under devices.

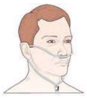
Majority of pressure injury occur in the pelvis (sacrum/coccyx)

Heels are second most common location.

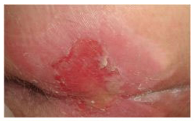
Etiology of a Pressure Injury

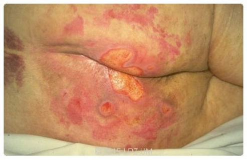
- Friction:
  - the resistance that one surface or object encounters when moving over another.

- Friction and moisture also contribute to the development of pressure ulcers.
- In some individuals, pressure ulcers can occur in as little as two hours.
- Skin damage from pressure or shear may not be visible on the skin for 48 hours or more.



Etiology of a Pressure Injury





- Moisture
  - Excessive moisture on the skin surface (perspiration, urinary, fecal incontinence) is thought to increase risk of pressure injury development

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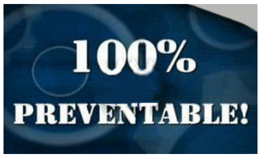
We know that most pressure ulcers are preventable!

In order to prevent pressure injuries, interventions must be applied:

- early
- diligently, and
- consistently.



Prevention is the key!

- Anticipate who will be at risk for skin breakdown.
- Start prevention strategies before skin breakdown occurs.
- Pressure ulcers are a nursing sensitive measure.

Tools to prevent pressure ulcers:

- Skin inspection upon admission and on an ongoing basis.
- Daily Braden Risk Assessment Scale to identify patients with the greatest risk of developing pressure ulcers.
- Nurse initiated prevention strategies,

PREVENTION OF PRESSURE INJURIES IN LTC

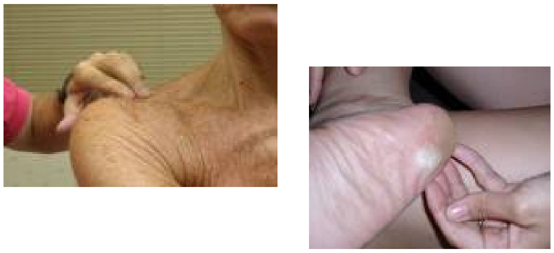
- Inspect resident's skin on day of admission or re-admission and on a weekly basis thereafter.
- Complete Tissue Tolerance testing for repositioning needs upon admission/re-admission, annually or with a significant change.
- Complete a Braden Risk Assessment for 4 weeks after admission starting on date of admission, then quarterly or with a significant change.
- Care plan appropriate seating/bed pressure relieving surfaces.
- Care plan repositioning needs if resident is unable to reposition self.

Skin Inspection:

A comprehensive, head to toe skin inspection must be done to determine whether existing skin breakdown is present and identify hospital acquired skin breakdown in the very early stages.

Pay special attention to bony prominences

Your skin inspection should also include palpation of the skin



Especially helpful in dark skinned individuals

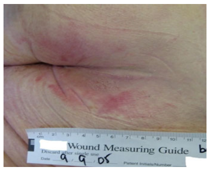
Be sure to inspect under/around any devices that may be removed such as braces and splints,
tubing and boots.

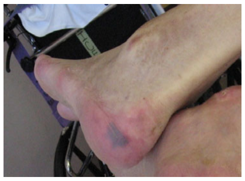
Pressure ulcers frequently occur under tubing, braces, collars, heel suspension boots, tracheotomies and other devices. The skin inspection must include assessment of the skin under these devices.

Chances to look at skin

- Bathing
- Bedpan and toileting
- Putting on shoes/slippers
- Turning/re-positioning
- Applying braces/ Teds/ pneumo boots and other devices
- Dressing changes

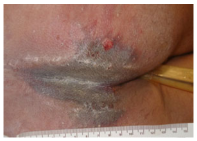
What to look for?



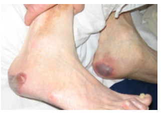


When a pressure injury starts, it may appear as a bruise, a blister or just an area of redness.

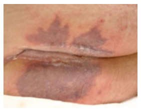
It may be difficult to tell whether skin breakdown is a pressure injury or not.

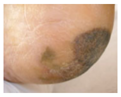


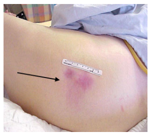
Suspected Deep Tissue Injury at sacrum.



Blisters and suspected deep tissue injury on bilateral heels.

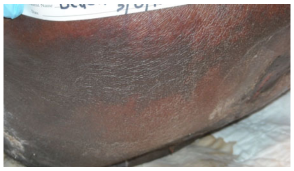


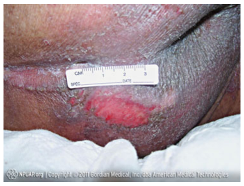




Stage I pressure injury on left trochanter.

Early pressure ulcers are more difficult to see on dark skin: make sure lighting is good





Staging of Pressure Injuries

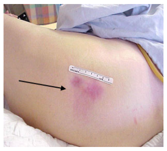
NATIONAL
PRESSURE
ULCER
ADVISORY
PANEL

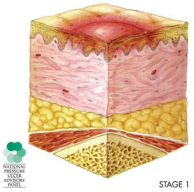
NPUAP

- In April 2016, the National Pressure Ulcer Advisory Panel (NPUAP) replaced the term “pressure ulcer” with “pressure injury” in the NPUAP Injury Staging System to reflect injuries to both intact and ulcerated skin.

Pressure Injury: Stage 1

- intact skin with non-blanchable erythema over a bony prominence.
- darkly pigmented skin may not have visible blanching; the color may differ from the surrounding area.
- may be painful, firm, soft, warmer or cooler as compared to adjacent tissue.



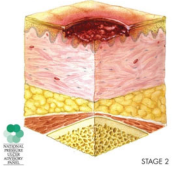


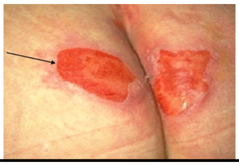
Pressure Injury: Stage 2

- partial thickness loss of dermis
- shallow open injury
- red or pink wound bed, without slough

or

- intact or open/ruptured serum-filled blister
- shiny or dry shallow injury without slough



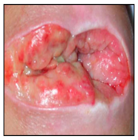


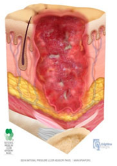
Stage 2 Pressure injury Is NOT

- moisture associated skin damage (MASD) including incontinence associated dermatitis (IAD),
- intertriginous dermatitis (ITD),
- traumatic wounds (skin tears, burns, abrasions).

Pressure Injury: Stage 3

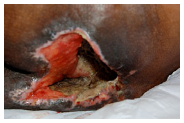
- full thickness loss of skin
- adipose (subcutaneous) fat may be visible
- granulation tissue may be present
- slough and/or eschar may be present
- fascia, muscle, ligament, or bone are not exposed
- may include undermining and tunneling
- depth varies by anatomical location.
- the bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue, Stage 3 ulcers can be shallow.

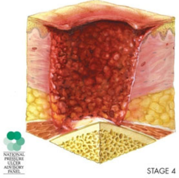




Pressure Injury: Stage 4

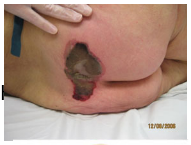
- Full thickness tissue loss with exposed bone, tendon or muscle.
- Slough or eschar may be present in some parts of the wound bed.
- May include undermining and tunneling.
- Exposed muscle, bone or tendon is visible or directly palpable.
- Depth varies by anatomical location.
  the bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue so these ulcers can be shallow.
- Because muscle and/or supporting structures are exposed (e.g., fascia, tendon or joint capsule) osteomyelitis may be possible.

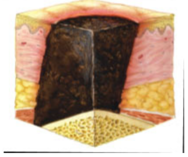


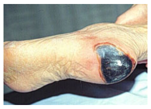


Unstageable

- full thickness tissue loss
- base of the injury is covered by slough (yellow, tan, gray, green or brown) and/or eschar (tan, brown or black)
- the true depth, and stage cannot be determined until enough slough and/or eschar is removed to expose the base of the wound
- *Stable (dry, adherent, intact without erythema or fluctuance) eschar on the heels serves as "the body's natural (biological) cover" and should not be removed.*

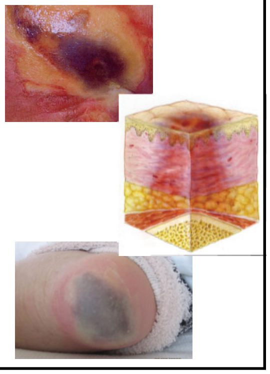






Deep Tissue Pressure Injury

- purple or maroon localized area of discolored intact skin or
- a blood-filled blister
- caused by damage to underlying soft tissue from pressure and/or shear.
- may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler than adjacent tissue.
- may be difficult to detect in individuals with dark skin tones.



Do Not Reverse Stage

"Pressure ulcers heal to progressively more shallow depth, they do not replace lost muscle, subcutaneous fat, or dermis before they re-epithelialize.

Instead, the ulcer is filled with granulation (scar) tissue composed primarily of endothelial cells, fibroblasts, collagen and extracellular matrix. A Stage IV pressure ulcer cannot become a Stage III, Stage II, and/or subsequently Stage I. When a Stage IV ulcer has healed it should be classified as a healed Stage IV pressure ulcer not a Stage 0 pressure ulcer. Therefore, reverse staging does not accurately characterize what is physiologically occurring in the ulcer". NPUAP position statement on reverse staging

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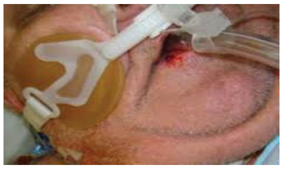
Mucosal Membrane Pressure Injury

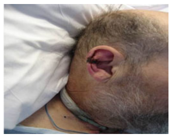
- Mucosal membrane pressure injury is found on mucous membranes with a history of a medical device in use at the location of the injury. Due to the anatomy of the tissue, these ulcers cannot be staged.



Medical Device Related Injuries

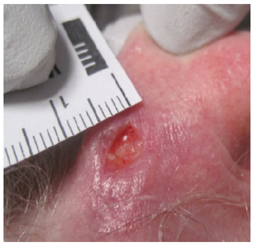
Medical Device Related Pressure injury

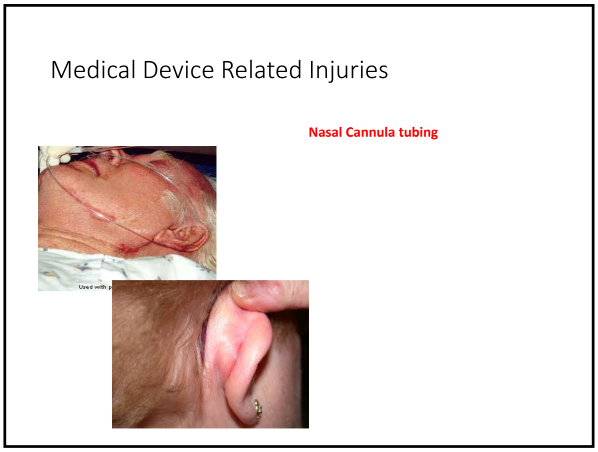
- This describes an etiology.
- Medical device related pressure injuries result from the use of devices designed and applied for diagnostic or therapeutic purposes.
- The resultant pressure injury generally conforms to the pattern or shape of the device.
- The injury should be staged using the staging system.



Medical Device Related Injuries

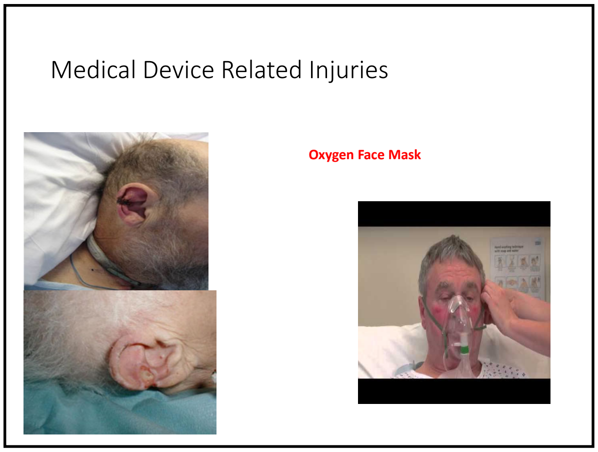
Nasal Cannula tubing





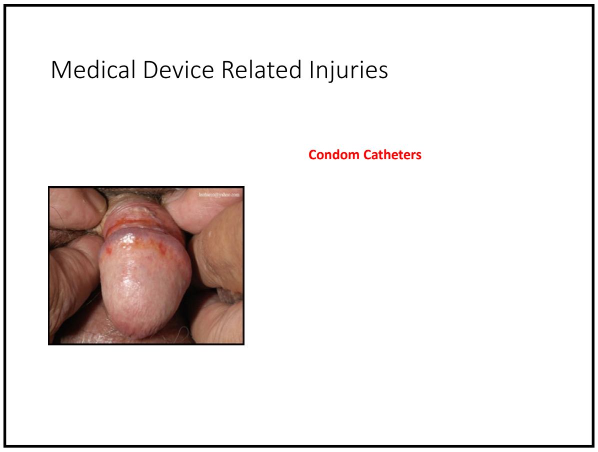
Medical Device Related Injuries

Nasal Cannula tubing



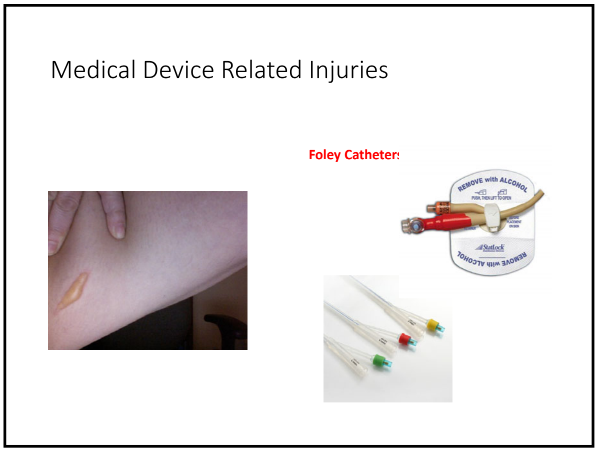
Medical Device Related Injuries

Oxygen Face Mask



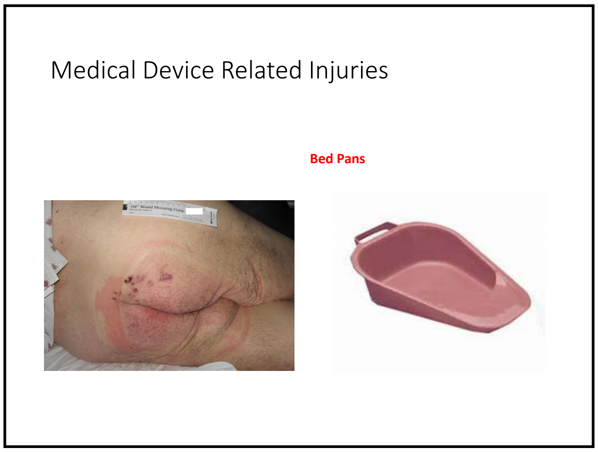
Medical Device Related Injuries

Condom Catheters



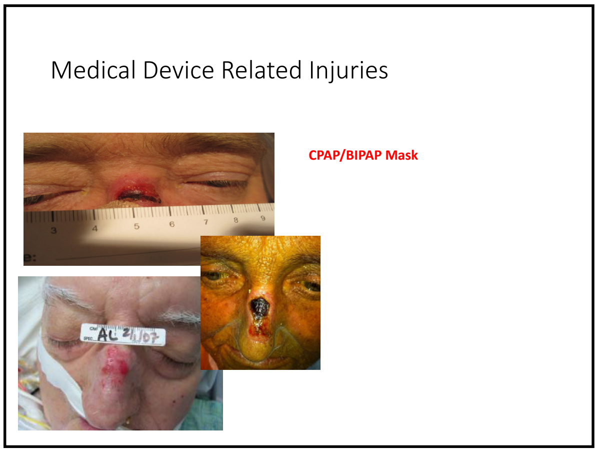
Medical Device Related Injuries

Foley Catheters



Medical Device Related Injuries

Bed Pans

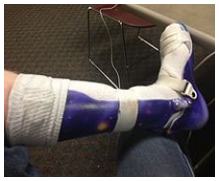


Medical Device Related Injuries

CPAP/BIPAP Mask

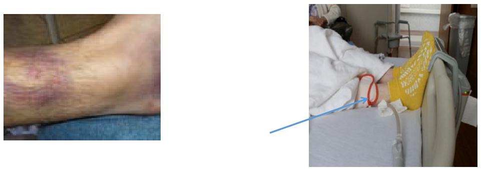
Medical Device Related Injuries

Splint



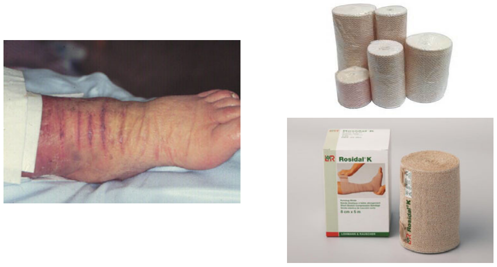
Medical Device Related Injuries

PneumoBoots/SCD's



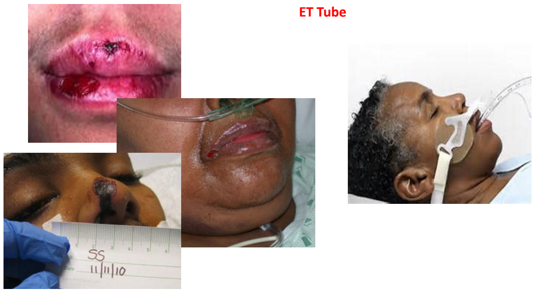
Medical Device Related Injuries

ACE W



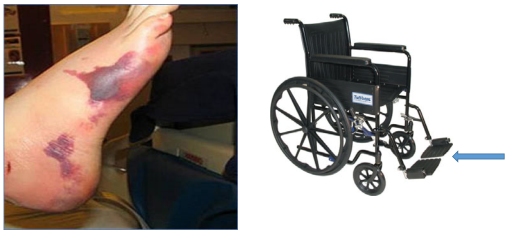
Medical Device Related Injuries

ET Tube



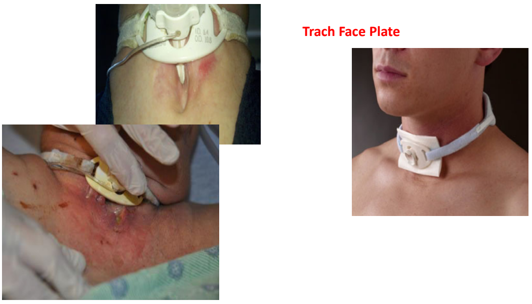
Medical Device Related Injuries

WheelChair Footplate



Medical Device Related Injuries

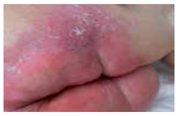
Trach Face Plate



Incontinence-Associated Dermatitis

What is IAD?

- Incontinence-associated dermatitis (IAD) is a type of inflammation of the skin that results from exposure to urine and/or stool.

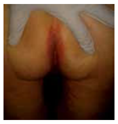


IAD

- IAD specifically refers to skin problems resulting from exposure to urine and/or feces.
- IAD is included in a much larger group of conditions referred to as moisture-associated skin damage (MASD).....this includes skin damage from wound drainage, perspiration, etc.

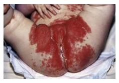
What are we looking for?

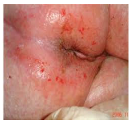
- Light skin tones – (pink – red)
- Darker skin tones – pale, darker color, purple, deep red, even yellow(?)
- Poorly defined borders
- Can be patchy
- Can cover large areas
  - Full peri-anal area, buttocks, sacrococcygeal area, thighs



What are we looking for?

- May present with vesicles or bullae, papules or pustules
- Epidermis deeply damaged or fully eroded, leaving moist or weeping dermis
- Area may be painful, burning, itching
- Affected skin susceptible to secondary skin infections
  - candidiasis most common





What do IAD and Pressure Ulcers have in common?

- Occur in patients with poor health (especially nutrition)
- Compromised mobility
- Raise the risk of infection
- IAD and Pressure injury can co-exist
- Incontinence is a risk factor for pressure injury development (20% more likely to get a pressure ulcer)

IAD vs Pressure injury

Parameter	IAD	Pressure injury
History	Urinary and/or fecal incontinence	Exposure to pressure/shear
Symptoms	Pain, burning, itching, tingling	Pain
Location	Perineum, peri-genital area; buttocks, gluteal fold, medial/post thighs, lower back, may be over bony prominence	Usually over bony prominence / under medical device
Shape/edges	Diffuse, poorly defined edges/blotchy	Distinct edges
Presentation/depth	Intact with erythema, superficial, partial thickness skin loss.	Intact skin with non-blanchable erythema to full thickness skin loss. Base may contain non-viable tissue.
Other	Possible secondary superficial skin infection (candidiasis)	Possible secondary soft tissue infection

Management

- Prevention!!!
- Early identification.
- Treatment of any reversible conditions.
- Diverting may be needed
  - foley, condom catheter (MEASURE), retracted penis pouch
  - fecal pouch, rectal tube

- Structured skin care protocol
  - Cleansing
  - Protecting
  - Moisturizing

Management

- Cleansing
  - Daily and after every episode of fecal incontinence
  - Be gentle – minimize friction, rubbing, scrubbing
  - Non alkaline soaps
    - Best is no-rinse, pre-moistened wipe with proper pH

Management

- Protecting with moisture barrier
  - Apply the skin protectant at a frequency with its ability to protect the skin.
  - Skin protectant should be compatible with other product being used.
  - Apply to all skin exposed to urine and/ or stool.

  - Many products already combine products that cleanse and protect (and restore) in one.

Management

Principle Ingredient	Description	Notes
Petrolatum (petroleum jelly) -Aloe Vesta -Vaseline -Aquaphor - "soothing ointments"	Derived from petroleum processing. Common base for ointments.	Forms occlusive layer. May affect absorbency of pads. Transparent when applied thinly. Good barrier for urine but not stool.
Zinc Oxide **-Criticaid** **-Sensicare** **-Calmoseptine** **-Sooth and Cool by Medline**	White powder (Carboxymethylcellulose) mixed with a barrier (zinc) form an opaque cream, ointment or paste.	Can be difficult to remove. Challenge for skin inspection Remove easily with mineral oil or a petrolatum based product.
Dimethicone **-A&D ointment** **-Barrier cloths from variety of vendors.**	Silicone-based	Non-occlusive, does not affect absorbency of pads as much. Usually transparent after application. Good barrier for urine but not stool.

Management

- Secondary infection
  - Usually candidiasis
    - Treated with anti-fungal
      - Powder, cream or ointment
      - Intradry

Building Blocks of Incontinence Protocol

- **Intact skin** – incontinence wipe + (maybe) skin protectant
- **Red (intact) skin** – incontinence wipe + skin protectant (ointment)
- **Red (denuded) skin** – incontinence wipe + skin protectant (ointment or paste)
- **Broken skin plus infection** – incontinence wipe + skin protectant ointment with anti-fungal component.

- Improvement should be noticed in 3-4 days.

Risk Assessment Tool

- **Braden Risk Assessment**
  - Sensory Perception
  - Moisture
  - Activity
  - Mobility
  - Nutrition
  - Friction and Shear

Braden Risk Assessment Scale for Predicting Pressure injury Risk

- Developed by Barbara Braden and Nancy Bergstrom.
- Purpose of the scale is to identify patients at risk.
- Most commonly used in Midwest
- Braden Q is modified version for Pediatrics.

Braden Risk Assessment Scale for Predicting Pressure injury Risk

- The tool is used world wide and translated into many languages.
- Results show it has the best reliability in a variety of settings.
- AND is a better predictor of pressure ulcers than nursing judgment.

Braden Scale

- Daily assessment made up of Six subscales down the left hand column
  - Each subscale has three or four assessment choices
- assess on each subscale
- assign score to each subscale
- total score will be between 6-23

  - Lower score = Higher risk

Sensory Perception

Ability to perceive/respond meaningfully to pressure d discomfort:

Top Row = LOC

Pain is a blessing from God

1) Completely Limited:
   - coma; no moaning, reflex flinching; flexion or extension
     test: Pinch upper arm or thigh – NOT fingers, toes or nail beds
2) Very Limited:
   - unconscious; no response to verbal command; may flinch or moan with stimuli
3) Slightly Limited:
   - responds to verbal commands, may not open eyes

Sensory Perception

Second Row = Cutaneous Sensation
(usually from neurological deficits)

1) Completely Limited:
  - cannot feel pain over most of the body;
  - Quadraplegic

2) Very Limited:
  - cannot feel pain over half of the body;
  - Paraplegic

3) Slightly Limited:
  - cannot feel in one or two extremities;
  - peripheral neuropathy, chronic vascular disease

Moisture

How often is skin exposed to moisture

- *Moisture being incontinence, perspiration, and wound drainage*

1) Constantly Moist:
  moist nearly all of the time – constant urine dribbling, perspiration (autonomic nervous system deficit), fever, high exudate wounds

2) Very Moist:
  dry 2-3 hours at a time; linen change three times a day or more

3) Occasionally Moist:
  daily linen change, infrequent moisture exposure

4) Rarely Moist:
  dry for more than a day at a time, incontinent 2-3 times a week

Activity

Degree of physical activity, ambulation

1) Bedfast:
  cannot sit in chair – even one time a day
  -does not apply with order for bedrest

2) Chairfast:
  two positions – sitting or lying down
  little standing or walking (1-2 steps, transfers) para or quad

3) Walks Occasionally:
  walks briefly twice a day, briefly

4) Walks Frequently:
  walks every hour or two

Mobility

Assess *Ability* and *Motivation*

Remember, a patient may bedridden by order, but has the ability to change positions in bed

Does the patient have the motivation to maintain position changes?
  - do not consider how often staff assisted turning is done
  - do consider patient's ability to make slight changes and maintain that change

Mobility

1) Completely Immobile:
  cannot change position without help

2) Very Limited:
  makes occasional change by self, but unable to maintain this position
    - depression or sedation may be a factor
    - prefers one position

3) Slightly Limited:
  can shift some but needs help to make complete change

4) No Limitation:
  moves without assistance and without reminder

Nutrition

Usual food intake pattern is the key

- Sometimes difficult to determine
- Needs 8-10 calories per pound

What is usual for this patient – not a temporary situation
- usually good food intake
  - NPO for procedure, usual is good
- usually poor intake
  - Just started tube feeding or TPN, usual is poor

Nutrition

Top Row – Food by Mouth

1) Very Poor:
   diet below health requirements, little protein, no supplements
2) Probably Inadequate:
   small portions, inconsistent, rarely eats complete meal
3) Adequate:
   eats fairly well, may need encouragement, occasionally refuses a meal (4 services of protein)

4) Excellent:
   good appetite; balanced within food groups

Nutrition

Second Row–IV, liquid supplement, tube feeding, TPN

1) Very Poor:
   standard IV or clear liquids, NPO >/=5days

2) Probably Inadequate:
   only intake liquid supplements & less than recommended qty

3) Adequate:
   tube feeding, TPN

Friction and Shear

- Friction = light force
  - may cause superficial abrasions
- Shear = greater force
  - damage to deeper tissue

1) Problem:
   needs assistance, skin slides on sheets, is repeated often; constant movement, agitated.
2) Potential Problem:
   some exposure to friction and shear without enough force to cause injury, slides with light force.
3) No Apparent Problem:
   moves without assistance, enough muscle strength to lift and move, maintains position.

Case Study #1

- 42 year old male admitted last night with a fever of 102. Has history of GSW, paraplegia, hypotension, and diabetes.
- He has a right IT Stage III pressure injury which drains copious amounts of exudate and needs QID dressing changes, as well as new Stage II right buttock pressure injury. He currently suffers from severe depression and his medications include multiple narcotics and anti-depressants. He is alert and oriented x 3.
- He spends most of his time in his wheelchair, he needs assistance of one to transfer to his bed. He is able to reposition with assist of one, but often refuses to turn and prefers his right side.
- He frequently complains of pain, is not interested in meals, though may eat bites of chicken and potatoes, leaving other foods on his plate. Refuses his Boost most days.

Braden Score / Case Study

- Sensory Perception: 2 (alert but para)
- Moisture: 1 (high fever and draining wound)
- Activity: 2 (sits in chair or lies in bed)
- Mobility: 2 (can make changes, but not motivated)
- Nutrition: 2 (small portions, not full meals)
- Friction/shear: 1 (slides in transfer, needs help)

- Score: 10 - Risk

Clinic Skin Screen

- Skin Screen
  - Patient reports any current pressure ulcers, a history of pressure ulcers, or a wound from a medical device – OR –
  - Patient is bed-confined or a wheelchair user – OR –
  - Patient requires assistance to transfer / change position
- Yes to any of the above questions?
- Skin Screen is Positive and a Skin Inspection is required.

- No – Skin Screen is Negative, no Skin Inspection needed.

Clinic – Case Study #1

Patient is 46 year old male, para for last 15 years, uses wheelchair for mobility and reports spending most of his time in the chair. Patient has non-leaking suprapubic urine catheter and has a bowel program with few problems.

Patient presents with dog bite on his left arm for assessment, fever of 101. Lives alone with PCA help 5 days a week.

Wound is painful, erythemic with copious amounts of purulent drainage.

Patient depends on Meals on Wheels 3 days a week, otherwise reports eats mostly dry cereal and frozen meals.

Due to bite, he now needs help repositioning and transferring in his wheelchair.

SP-2 M-3 A-2 M-2 N-2 F/S-1

Clinic Case Study #2

Patient is 84 year old male, with hx of diabetes presents at clinic for assessment and dressing change to LLE pressure injury from CAM boot. Patient recently lost his wife, his clothing is disheveled, walking slowly with use of a cane. Weigh in reveals a recent unexplained weight loss of 10lbs.

Patient with flat affect, reports diminished interest in food, eating mostly frozen dinners.

His son accompanying him to the clinic and reports new, recent, occasional urinary incontinence and increased difficulty getting out of his recliner.

SP-3 M-2 A-3 M-3 N-1 F/S-2

Inpatient Case Study #1

Patient is 46 year old male with hx of morbid obesity, and diabetes who was found down in his apartment due to a fall. EMS reports the apartment was uninhabitable, patient lying in urine and feces with right femur fracture. In addition, he has a new draining right trochanter Stage 3 pressure injury and severe yeast rash in the lower abdominal fold.

Patient alert to self only, slow clearing from sedation and pain meds. Has a foley in place, using a bed pan.

Patient has bedrest orders at this time, will need extensive PT due to deconditioning and change in weight bearing status. Needs three staff to reposition.

SP-3 M-2 A-1 M-2 N-2 F/S-1

Inpatient Case Study #2

Patient is 24 year old male, hospitalized as result of bike accident. Patient was without helmet and had blood alcohol level of 0.34 and ran into a parked truck. Injuries include TBI and left radial facture. Patient is intubated, and sedated, pressure support is unsuccessful so far. Patient has a foley catheter and bowel management system in place. Is on bedrest with positioning to right side and supine positons only. Has tube feeds running at goal for the past 5 days. Has OT orders for range of motion at this time.

SP-1 M-3 A-1 M-1 N-3 F/S-1

Braden Scale for Predicting Pressure Sore Risk

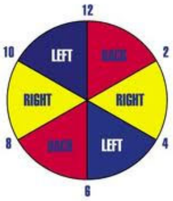
- Add the numbers together
- 18 or less, considered At Risk
- Skin Bundle strategies (prevention measures) should be initiated

Nursing Initiated Prevention Strategies

Prevention Nursing Order
vs.
Skin Bundle

Initiate strategies before skin breakdown has a chance to occur!

Re-position bed-bound persons *__at least__ every 2 hours and chair-bound persons every hour*



If unable to perform an actual turn, consider micro-turns and sacral off-loading

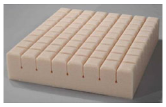
Use Pillows or Heel Boots to Suspend Heels

Keep head of bed less than 30 degrees*

Less than 30 degrees reduces the shearing and friction forces that may cause tissue injury over the sacrum.

* When medically appropriate

Make Sure "At-Risk" Persons are on Pressure Re-Distributing Surfaces



Use draw sheet, slip sheet, ceiling lift or other lift device to avoid friction/ shear during turns and re-positioning.

Remember to inspect under/around any devices that may be removed such as braces and splints,
tubing and boots.

Inspect skin around devices at least every shift if not more often

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Nutrition

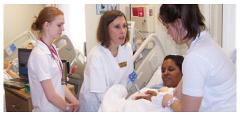
Good nutrition is vital to both wound healing and the prevention of pressure ulcers.

- Involve dietician as soon as risk is identified
- Monitor whatever nutritional parameters your facility uses
- Monitor for vitamin deficiencies and consider supplements

Education

Be sure to include both the patient and family members in your prevention plan

Why?
How?
What to look for?



Start Prevention Measures as Soon as Possible!

Turn/re-position as soon as patient arrives on unit.
Have specialty bed delivered before patient arrives.
Have incontinence care products in the room
Etc……….

Reference

- National Pressure Ulcer Advisory Panel (NPUAP). NPUAP Pressure Injury Stages (accessed Oct 8, 2018)